PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q55086

Hisashi WATANABE, et al.

Application No.: 09/361,118

Group Art Unit: 1731

Confirmation No.: 5143

Examiner: C. FIORILLA

Filed: July 27, 1999

For: ALUMINA SINTERED BODY AND PROCESS FOR PRODUCING THE SAME

SUBMISSION OF APPELLANT'S BRIEF ON APPEAL

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. Applicants previously paid a Brief on Appeal fee of $320.00. The Examiner then reopened the prosecution. Accordingly, applicants believe that they need only to pay the difference between the present fee of $330.00 and the previous fee of $320. Accordingly, a check for the statutory fee of $10.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

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Date: May 5, 2004

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APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

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Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 1.192, Appellant submits the following:

I. REAL PARTY IN INTEREST

The real party in interest is Sumitomo Chemical Company, Limited, of Osaka Japan.

II. RELATED APPEALS AND INTERFERENCES

There are no other related appeals and interferences.

III. STATUS OF CLAIMS

Claims 1 to 12 are all of the claims that have been presented.

Claims 9 to 12 have been subjected to a restriction requirement and have been withdrawn from further consideration.

Claims 1 to 8 have been rejected and are the claims on appeal.

IV. STATUS OF AMENDMENTS

There were no amendments to the claims that were presented after final rejection.

V. SUMMARY OF THE INVENTION

The present invention relates to a process for producing a polycrystalline alumina sintered body which comprises the steps of preparing a slurry by subjecting alumina powder and a solvent to ultrasonic irradiation, mechanical stirring not using a grinding medium, or ultrasonic irradiation and mechanical stirring not using a grinding medium, to provide a slurry of alumina dispersed in a solvent. Page 4, line 19 to page 5, line 1; page 10, lines 11 to 13, page 12, lines 6 to 12.

The slurry is dried and formed to produce a green body. Page 5, lines 2 to 3; page 45, line 7 of original claim 1.

The green body is then sintered in an air atmosphere at a temperature in the range of 1400°C to 1800°C. Page 5, lines 4 to 5.

The alumina powder has a purity of 99.99 wt% or more, and comprises α alumina particles having a polyhedryl shape and substantially no fractured surface. Page 5, lines 7 to 8 and page 6, lines 5 to 7 and 9 to 10.

The alumina powder exhibits specific properties. Page 5, lines 8 to 19. The alumina powder has an average particle size of 0.1 μm or more to 1.0 μm or less. Page 5, lines 14 to 16 and page 6, lines 17 to 18.

VI. ISSUES

The issues on appeal are as follows:

(1) Whether the Examiner was correct in rejecting claims 1 to 8 under 35 U.S.C. § 103 as obvious over Mohri et al in view of Huang or Ali et al.

(2) Whether the Examiner was correct in rejecting claims 1 to 8 as obvious over Mohri et al in view of Aihara et al and the Dictionary of Ceramic Science and Engineering.

VII. GROUPING OF CLAIMS

The claims stand or fall together.

VIII. ARGUMENTS

A. The Rejection of Claims 1 to 8 under 35 U.S.C. § 103(a) as Obvious over Mohri et al in View of Either Huang or Ali et al Should Be Reversed.

The present invention, as set forth in claim 1, relates to a process for producing a polycrystalline alumina sintered body which comprises the steps of (1) preparing a slurry by subjecting alumina powder and a solvent to ultrasonic irradiation, mechanical stirring not using a grinding medium, or ultrasonic irradiation and mechanical stirring not using a grinding medium, to provide a slurry of alumina dispersed in a solvent, (2) drying and forming the slurry to produce a green body, and (3) sintering the green body in an air atmosphere at a temperature in the range of 1400°C to 1800°C.

As set forth in claim 1, the α-alumina powder has a purity of 99.99 wt% or more, and comprises α-alumina particles having a polyhedryl shape and substantially no fractured surface.

Claim 1 sets forth specific properties for the alumina powder, including a particle size of 0.1 to 1.0 μm.

The polycrystalline alumina sintered body provided by the present invention has a high purity and extremely less pores. See page 4, lines 14 to 19 of the present specification.

In essence, the Examiner has argued that Huang and Ali et al disclose mixing a slurry of powder and solvent by ultrasonic energy, and argues that in view of the teaching at column 6, line 31 of Mohri et al that the mixing in Mohri et al can be carried out in any conventional manner, it would have been obvious to employ an ultrasonic mixing to make the slurry in Mohri et al.

Mohri et al disclose a process for producing <u>alumina ceramics</u>. Mohri et al disclose that an α-alumina powder used as a raw material has an average particle diameter of 0.1-5 μm. See column 5, lines 58 to 60. Mohri et al disclose that mixing can be carried out in a conventional manner, such as a ball mill and a vibration mill. See column 6, lines 31-33.

Huang discloses a process for producing <u>silicon nitride, and does not relate to making alumina slurries</u>. Huang discloses that a silicon powder used as a raw material has an average particle diameter of 2-20 μm. See column 3, lines 5 to 9. Huang discloses that a slurry including silicon powder and solvent and other raw material is subjected to ultrasonic irradiation. See column 3, lines 23 to 25.

Ali et al disclose a process for producing <u>aluminum nitride, and do not relate to making alumina slurries</u>. Ali et al employ a raw material that comprises 72 wt% coarse aluminum nitride powder having a particle diameter of about 64 μm (+240 mesh) to about 104 μm (-140 mesh),

and 28 wt% fine aluminum nitride powder having a particle diameter of about 38 μm (-400mesh). See column 4, lines 4 to 8, and column 4, lines 20 to 25.

Ali et al disclose that a slurry including aluminum nitride powder and a liquid carrier is mixed in an ultrasonic mixer. See column 4, line 67 to column 5 line 1.

Applicants set forth in the following Table 1 a Summary of the Inventions Disclosed by the above cited references.

Table 1

Summary of Inventions Disclosed by References

References	Raw material		Dispersion apparatus
	Kind	D50	
Mohri et al	Alumina *1	0.1-5 μm	Ball mill, Vibration mill
Huang	Silicon	2-20 μm	Ultrasonic irradiation
Ali et al	Aluminum Nitride	Min. 46 μm*2	Ultrasonic irradiation

*1 polyhedral shape.
*2 46 μm (=64 μm x 0.72; Coarse aluminum nitride powder having D50 of 64 μm is 72 wt% and fine aluminum nitride powder is neglibible).

Huang is different from Mohri et al in terms of the kind of raw material, as well as the dispersion apparatus, as shown in Table 1 above.

There is an overlap of D50 between Mohri et al and Huang.

However, the above range of overlap between Mohri et al and Huang, for example 2 μm, is not within the scope of the present invention, where the alumina powder has an average particle size of 0.1 μm or more to 1.0 μm or less. See page 39, Comparative Example 5 of the present specification where the primary particle size of the alumina employed in the Comparative Example was 2 μm.

Further, Ali et al is different from Mohri et al in terms of the raw material, as well as the dispersion apparatus and particle size as shown in Table 1 above.

Therefore, appellants submit that there is no motivation for one of ordinary skill in the art to combine the teaching of either Huang or Ali et al with Mohri et al, at least with respect to replacing the "Ball mill" and "Vibration mill" taught by Mohri et al with the "Ultrasonic irradiation" taught by Huang or Ali et al.

Appellants submit that the teachings of either Huang or Ali et al could not be combined with Mohri et al to arrive at the presently claimed invention because one of ordinary skill in the art would be required to employ an undue trial and error technique without any reasonable expectation of success. Thus, there are a large number of combinations that result from the teachings of the references, at least 18 cases {=3 (kinds of raw materials) x 2 (D50) x 3 (dispersion apparatus)}, and therefore an undue amount of experimentation is required for selecting one element, that is, ultrasonic irradiation, in the right combination from more than 18 possible combinations.

Both Huang and Ali et al disclose employing ultrasonic mixing to make a slurry. Appellants submit, however, that one of ordinary skill in the art would not have been led to

combining the teaching of these references with Mohri et al because their technical fields are much different from each other and they do not relate to the same art.

In particular, according to Mohri et al, the main object of the invention is to provide an alumina composition which provides, on sintering, an alumina ceramic having wrap resistance and high dimensional precision. See Mohri et al, column 2, lines 5-9.

On the other hand, the object of the invention disclosed in Ali et al is to provide an improved packaging material for use with electronic devices. See Ali et al, column 2, lines 9-20. The Ali et al patent is directed to making an alumina nitride/aluminum composite, and does not relate to making alumina slurries.

Further, the invention disclosed in Huang is directed to a method for producing a sintered reaction bonded silicon nitride composite which is reinforced with silicon carbide whiskers, which contains silicon nitride particles, or both. Thus, the Huang patent is directed to a silicon nitride composite containing silicon carbide whiskers or silicon nitride powders, and does not have anything to do with making alumina slurries.

Appellants submit that the inventions described in these references provide different materials or devices with different features. Accordingly, one of ordinary skill in the art would not have had any motivation to combine the teachings of these references.

With respect to appellants' argument that one of ordinary skill in the art would not have combined the teachings of Huang and Ali et al with those of Mohri et al because they do not relate to the same art, the Examiner has argued that all of these references relate to ceramic materials. More particularly, the Examiner has argued that the references relate to the mixing of

slurries of ceramic materials and, therefore, they all relate to the same art, that is, the art of mixing ceramic slurries.

Appellants submit that this argument of the Examiner is not well founded because it is an over simplification to state that all of the references relate to the same art of mixing ceramic slurries. The references, in fact, relate to making different compounds by different reactions. Mohri et al relate to making an alumina composition, Ali et al relate to making an aluminum nitride/aluminum composite, and Huang relates to a silicon nitride composite. Since the references relate to different compounds, appellants submit that they do not relate to the same art, and that one of ordinary skill in the art would not have been led to combining them.

In view of the above, appellants submit that there is no motivation to combine the teachings of either Huang or Ali et al with Mohri et al.

In summary, the references do not relate to that same art, and one of ordinary skill in the art would not have been led to combining the teachings of these references.

It has not been shown that a person of ordinary skill, seeking to solve a problem in the area of an alumina ceramic Mohri et al, would reasonably be expected or motivated to look to a method of making silicon nitride composite containing silicon carbide whiskers or silicon nitride powders (Huang) or directed to making an alumina nitride/aluminum composite (improved packaging material for use with electronic devices) (Ali et al). The combination of elements from non-analogous sources, in a manner that reconstructs an applicant's invention only with the benefit of hindsight, is insufficient to present a prima facie case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill

in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself. In re Oetiker, 24 USPQ2d 1443, 1446 (Fed. Cir. 1992)

Turning now to the statement in Mohri et al that conventional mixing can be used, this statement refers to conventional methods of mixing alumina slurries. Mohri et al describe two such methods, namely, ball mill or a vibration mill, each of which involves a grinding. Thus, Mohri et al, at column 6, lines 30 to 32 and at lines 60 to 62, state that "Mixing of α-alumina and the other components can be carried out in a conventional manner, for example, by means of a ball mill or a vibration mill". According to this description, a ball mill or a vibration mill are the conventional methods of mixing α-alumina. Appellants submit that it was not conventional to mix α-alumina by ultrasonic mixing.

Mohri et al, at column 4, lines 14-15, does refer to "ultrasonication", but this description relates to a method for mixing transition alumina and seed crystal to produce α-alumina and not for dispersing α-alumina to prepare a slurry. Appellants submit that these descriptions in Mohri et al support appellants' position that Mohri et al do not teach or imply ultrasonic irradiation as a conventional method for dispersing α-alumina.

With respect to appellants' argument that it was not conventional to mix α-alumina by ultrasonic mixing, the Examiner has asserted that arguments of counsel cannot take the place of evidence, and that the disclosure in Mohri et al of specific mixing processes do not limit the broad statement in Mohri et al that mixing can be carried out in a conventional manner.

In response, appellants submit that the burden is on the Examiner to show that it was conventional to mix α-alumina by ultrasonic mixing, rather than on appellants to show that it

was not conventional to mix α-alumina by ultrasonic mixing. The Examiner has not provided any evidence to support his position that it was conventional to mix α-alumina by ultrasonic mixing. Rejections cannot be based on unsupported assertions by the Examiner.

One of the purposes of employing the ultrasonic mixing in the present invention, as disclosed at page 10 of the present specification, is to reduce the formation of aggregates. The Huang patent, at column 3, lines 23 to 25, discloses that ultrasonic vibration breaks down agglomerates.

As described at page 10 of the present specification, the alumina powder used as a raw material in the present invention contains such a small amount of agglomerates, and such uniform particle shape and particle size, that the alumina powder can be dispersed to form a uniform slurry only by irradiating with ultrasonic wave. It is also well known that the mixing methods using grinding media have higher energy to reduce the formation of agglomerates than an irradiation with ultrasonic wave. Thus, even if Huang discloses ultrasonic irradiation to reduce the formation of agglomerates, it does not mean that it is obvious to replace the mixing methods using the grinding media in Mohri et al with the ultrasonic mixing technique of Huang because Huang does not disclose or teach the alumina powder used in the present invention that contains small amount of agglomerates and has a uniform particle shape and the particle size recited in claim 1. Further, Huang merely discloses the use of an ultrasonic mixer.

Additionally, as can be seen from the discussion of particle sizes set forth above in Table 1, the particle size used by Mohri et al that is within the range set forth in the present claims (0.1 to 1.0 μm) is smaller than that used by Huang or by Ali et al. Alumina powders having a large

particle size, such as the 2-20 μm size in Huang or the 46 μm size in Ali et al (which are sizes for particles other than alumina), may be somehow well dispersed by ultrasonic irradiation because such an alumina powder has a weak force to agglomerate, but a smaller particle size has a stronger force to agglomerate. A small particle size, such as of less than 1 μm as recited in the present claims, is usually considered to be difficult to well disperse by a weak pulverizing power such as ultrasonic irradiation.

If α-alumina is not dispersed in a slurry, the density of a sintered body obtained by calcining a green body produced by the slurry does not increase, and a high density sintered body like that of the present invention cannot be obtained.

With respect to appellants' argument that even though Huang discloses ultrasonic irradiation to reduce the formation of agglomerates, this disclosure does not mean it would have been obvious to replace the mixing methods using the grinding media in Mohri et al with the ultrasonic mixing technique of Huang because Huang does not teach the alumina powder employed in the present invention and merely discloses the use of an ultrasonic mixer, the Examiner has argued that he is citing Huang for a teaching of a mixing method and not a teaching of the materials. The Examiner has asserted that Mohri et al call for conventional mixing, not grinding, and Huang clearly teaches a mixing technique.

In response, since Mohri et al describe that the conventional mixing is done by mixing techniques that employ grinding, appellants maintain that the conventional mixing in Mohri et al refers to mixing that employs grinding techniques. Moreover, contrary to the Examiner's assertion, the mixing method cannot be divorced from the materials that are being mixed.

The Examiner is improperly ignoring the different compositional, structural and functional differences between Mohri et al, Huang and Ali et al when making the combination. "The test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art." In re McLaughlin, 170 USPQ 209, 212 (CCPA 1971).

Further, Huang and Ali et al are silent about whether ultrasonic irradiation can be applied to a small particle size powder of 0.1 to 1 μm to obtain a well-dispersed slurry. Moreover, neither Huang nor Ali et al teach or imply the effect of application of ultrasonic irradiation to small particle size powder. Accordingly, even if Huang or Ali et al are combined with Mohri et al, it may, somehow render obvious a method for mixing transition alumina and seed crystal by ultrasonic irradiation to produce α-alumina, but it would not render obvious a method for dispersing α-alumina to prepare a slurry by ultrasonic irradiation.

In view of the above, appellants submit that there is no motivation to combine Mohri et al with Ali et al or Huang, much less to replace the mixing methods using the grinding media in Mohri et al with the ultrasonic mixing technique of Huang or Ali et al, and that even if such a combination were to be made, there is no teaching or suggestion that ultrasonic radiation can be applied to a small particle size powder of 0.1 to 1.0 μm to obtain a well-dispersed slurry.

In addition, Comparative Example 5 employed alumina particles having a polyhedryl shape, with each particle having substantially no fractured surface. The alumina particles of Comparative Example 5 had an average particle size of 2.0 μm, which is higher than the 1.0 μm upper value recited in claim 1, but is within the scope of Huang. The alumina particles of

Comparative Example 5 were made into granules and a green body in the same manner as Invention Example 7, in which the alumina particles were subjected to ultrasonic irradiation. As can be seen from the results shown in Comparative Example 5, the resulting alumina sintered body did not have a high density with less pores. See page 40 of the present specification. Comparative Example 5 is evidence that even with alumina particles of the shape prescribed in the present claims, a high density alumina sintered body with extremely less pores cannot be produced when the particle size is large and not within the scope of the present claims. See page 43 of the present specification.

Thus, in the range of particle size overlap between Mohri et al and Huang, the sintered body formed by the process of the present invention cannot be obtained. Accordingly, even if the teaching of Mohri et al and Huang are combined, one of ordinary skill in the art still would not arrive at the present invention.

Further, one of the features of the present invention is to use alumina powder comprising polyhedral particles having substantially no fractured surface. The alumina powder employed in the present invention, as set forth in claim 1, mainly includes polyhedral powders having substantially no fractured surface. The presence of a single particle having substantially no fractured surface would not satisfy the recitations of the present claims.

By using such specific alumina powder as set forth in claim 1, appellants can achieve the present invention.

Additionally, by using alumina powder comprising particles having substantially no fractured surface, the alumina powder is prevented from secondary agglomeration in the steps after the step of preparing the slurry.

The Examiner has stated that the recitation in the claims that the particles have substantially no fractured surface covers the presence of a single particle having no fractured surface. The Examiner has stated that "it is notoriously well known in the art that during mixing or milling some particles are unchanged and thus no fractured surfaces exist".

As regards substantially "no fractured surface", appellants submit that the Examiner misunderstands the recitations of the present claims. According to the present invention, the particles having substantially no fractured surface are the alumina powder used as a raw material, and are not particles that have been mixed or milled in the steps that occur after the step of preparing the slurry. Thus, it is irrelevant whether some particles are unchanged during mixing or milling.

The cited prior art references to Mohri et al, Huang and Ali et al do not disclose or suggest the use of aluminum powder comprising polyhedral particles having substantially no fractured surface. Accordingly, even if the teachings of Mohri et al, Huang and Ali were combined, one still would not arrive at the present invention.

With respect to appellants' arguments concerning the fact that appellants employ particles having substantially no fractured surface, the Examiner has stated that Mohri et al disclose, at columns 4 to 5, a method of preparing the alumina powder that is used in the Mohri et al process. The Examiner has stated that Mohri et al disclose that after these powders are prepared, there

may be some instances where the powder are subjected to simple grinding, as disclosed at column 5, line 35. The Examiner has stated that this refers to the powder before the slurry is prepared.

In response, appellants submit that the disclosure at column 5, line 35 of Mohri et al does not satisfy the recitations of the present claims of employing a powder having substantially no fractured surface. Mohri et al, at column 5, line 35, do not state that these powders have substantially no fractured surface. Appellants submit that the burden is on the Examiner to establish that Mohri et al contain a disclosure of the use of powders having substantially no fractured surface.

Further, in the experiments disclosed in Mohri et al, alumina powder was subjected to a ball milling. That is, alumina powder was dry blended, so that the alumina powder had fractured surfaces before preparing the slurry.

In view of the above, appellants submit that the cited prior art does not disclose or suggest the use of an alumina powder having substantially no fractured surface.

In view of the above, appellants submit that there is no motivation to combine Huang or Ali et al with Mohri et al, and that even if there is, the present invention is not obvious over Mohri et al in view of Huang or Ali et al.

For the above reasons, appellants submit that the subject matter of claims 1-8 is neither taught by nor made obvious from the disclosures of Mohri et al and Huang or Ali et al, and it is requested that the rejection under 35 U.S.C. §103(a) be reversed.

B. The Rejection of Claims 1-8 Under 35 U.S.C. §103 as Obvious Over Mohri et al In View of Aihara et al And The Dictionary of Ceramic Science And Engineering Should Be Reversed.

The Examiner's position with respect to Mohri et al is the same as in the rejection discussed in Section A above.

The Examiner states Aihara et al discloses a slurry of alumina powder and solvent formed by mechanical stirring not using a grinding medium (i.e., mixing with a trommel). The Examiner concludes that it would have been obvious to use the trommel mixing process of Aihara et al in the processes of Mohri et al in view of the statement in Mohri et al that mixing can be carried out in any conventional manner.

The Examiner also states that the alumina powder of Aihara et al lies within the particle size of claim 1.

Appellants submit that the present invention is not anticipated by or obvious over the disclosures of Mohri et al in view of Aihara et al and the Dictionary of Ceramic Science and Engineering.

First, the Dictionary of Ceramic Science and Engineering is only cited for the definition of a trommel.

Appellants' position concerning the disclosures of Mohri et al remain as stated in Section A above.

Aihara et al disclose a process for producing alumina ceramics parts. Aihara et al disclose that an alumina powder used as a raw material has an average particle diameter of 0.5 μm, and that alumina powder is mixed with water in a trommel. See column 5, lines 20 to 25.

Moreover, Aihara et al disclose that their invention relates to a process of annealing a sintered ceramic body. See, for example, the Abstract, column 1, lines 47 to 52, column 2, lines 47 to 50, column 3, lines 46 to 50, and claim 4. A process comprising no annealing is described in Comparative Example 1 of Aihara et al. See column 5, line 20 to column 6, line 3.

Aihara et al disclose a process that comprises a step of annealing a sintered ceramic body as an essential step.

On the other hand, the process of Mohri et al does not comprise a step of annealing.

Therefore, appellants submit that there is no motivation to combine Mohri et al comprising no annealing with Aihara et al comprising annealing as an essential step.

Additionally, while Mohri et al is directed to an alumina composition which provides on sintering an alumina ceramic having wrap resistance and high dimensional precision, Aihara et al is directed to a ceramic part to be exposed to a corrosive gas. Therefore, appellants submit that the technical field of Mohri et al is not related to that of Aihara et al. Accordingly, appellants submit that the Examiner has not established a motivation to combine Mohri et al with Aihara et al.

Further, like Mohri et al, Aihara et al do not relate to appellants' claimed type of alumina powder starting material. Thus, the teachings of Aihara et al do not overcome the deficiencies in the disclosures of Mohri et al relating to the type of alumina powder starting material. In particular, Aihara et al do not relate to alumina powder having a polyhedral shape in which the particles have substantially no fractured surface. Therefore, even if the disclosures of Mohri et al

are combined with Aihara et al, the present invention is not obvious over the combination of these references.

The Examiner's argument seems to be based on the fact that two different mixing techniques are known in the art. However, appellants submit that various mixing methods are known in the art for use in different and unrelated processes and purposes, and in different and unrelated references, and this fact of mere knowledge of different mixing methods does not, by itself, make their combination obvious to one of ordinary skill in the art.

The Federal Circuit has held that the fact that each element in a claimed invention is old or unpatentable does not determine the non-obviousness of the claimed invention as a whole. Custom Accessories Inc. v. Jeffrey-Allan Industries Inc., 1 USPQ 2d 1196, 1198 (Fed. Cir. 1986).

> [P]rior art references before the tribunal must be read as a whole and consideration must be given where references diverge and teach away from the claimed invention. Moreover, appellants [who are challenging patentability] cannot pick and choose among individual parts of assorted prior art references "as a mosaic to recreate a facsimile of the claimed invention." Akzo N.V. v. U.S. International Trade Commission, 1 USPQ 2d 1241, 1246 (Fed. Cir. 1986, citations omitted).

Appellants submit that the Examiner is merely recreating appellants' invention from various unrelated pieces of art using hindsight.

For the above reasons, appellants submit that the subject matter of claims 1-8 is neither taught by nor made obvious from the disclosures of Mohri et al in view of Aihara et al and the

Dictionary of Ceramic Science and Engineering, and therefore request that the rejection under 35 U.S.C. §103(a) be reversed.

The present Brief on Appeal is being filed in triplicate. Unless a check is submitted herewith for the fee required under 37 C.F.R. §1.192(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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APPENDIX

CLAIMS 1-8 ON APPEAL:

1. A process for producing a polycrystalline alumina sintered body which comprises the steps of:

preparing a slurry by subjecting alumina powder and a solvent to ultrasonic irradiation, mechanical stirring not using a grinding medium, or ultrasonic irradiation and mechanical stirring not using a grinding medium, to provide a slurry of alumina dispersed in a solvent;

drying and forming said slurry to produce a green body; and then

sintering said green body in an air atmosphere at a temperature in the range of 1400°C to 1800°C;

wherein said alumina powder has:

a purity of 99.99 wt% or more and comprises α alumina particles having a polyhedral shape, each having substantially no fractured surface, and having a D/H ratio of from 0.5 or more to 3.0 or less, wherein D represents a maximum particle diameter parallel to the hexagonal lattice plane of a hexagonal close packed lattice of α alumina, and H represents a maximum particle diameter perpendicular to the hexagonal lattice plane of a hexagonal close packed lattice of alumina;

a number-average particle size of from 0.1 μm or more to 1.0 μm or less; and

a D90/D10 ratio of 7 or less, wherein D10 and D90 are the particle sizes at 10% cumulation diameter and 90% cumulation diameter, respectively, from the smallest particle side in a cumulative particle size distribution.

2. The process according to claim 1, wherein an alumina powder in mixture with a sintering agent is subjected to ultrasonic irradiation, mechanical stirring not using a grinding medium, or ultrasonic irradiation and mechanical stirring not using a grinding medium, to provide a slurry of alumina dispersed in a solvent.

3. The process according to claim 1, wherein the maximum diameter of pores in said polycrystalline alumina sintered body is 10 μm or less, the number of said pores from 0.1μm or more to 10 μm or less per one mm^2 is 20 or less, said alumina purity is 99.99 % or more, and the density of said sintered body is 3.970 g/cm^3 or more.

4. The process according to claim 2, wherein the maximum diameter of pores in said polycrystalline alumina sintered body is 10 μm or less, the number of said pores of from 1 μm or more to 10 μm or less per one mm^2 is 10 or less, said alumina purity is 99.99 % or more, and the density of said sintered body is 3.975 g/cm^3 or more.

5. The process according to claim 2, wherein said sintering agent is added to said alumina powder in an amount of from 10 ppm or more to 2000 ppm or less in terms of oxide.

6. The process according to claim 2, wherein said sintering agent is added to said alumina powder in an amount of from 10 ppm or more to 70 ppm or less in terms of oxide.

7. The process according to claim 2, wherein said sintering agent is at least one compound selected from the group consisting of alkaline earth metal compounds and silicon compounds.

8. The process according to claim 2, wherein said sintering agent is a magnesium compound.